# An In-depth Study on the Theories of Technology Adoption- A Review of Literature

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ABSTRACT--With time and due to diverse factors the organization needs to be dynamic. Only those organizations could survive in the competitive markets which have different strategies towards survival and tends to change as per the environment. The primary goal of the organization must be adoption of upgraded technology which they need for their business organizational growth and development. This paper aims at providing information about the theories and models related to the technology adoption. This paper deals with the secondary data and does not include any of the statistical data but only methods in a diagrammatic way. Each theory and method is designed and developed by different authors and each method/ theory has a different viewpoint and factor that contributes towards the understanding of the individual behaviour. It has been found that all the theories have been widely used and empirically have been proved by different authors.

Keywords--DOI, TAM, UTUAT, UTUAT2

#### I. INTRODUCTION

The organization is influenced by various internal and external factors that influenced working of an organization. Technology plays a greater role in performance of the organization towards their consumers. Constantly changing technology leads to the adoption of technological models and theories by the organizations(Luna, 2017)(Orlikowski, 2008). With time and due to diverse factors the organization needs to be dynamic. Only those organizations could survive in the competitive markets which have different strategies towards survival and tends to change as per the environment. The primary goal of the organization must be adoption of upgraded technology which they need for their business organizational growth and development(Canonsburg, 2011)(Kluber, 2017).

There lies four types of existing technologies namely basic technology (use of basic technology used for years), key technology (key to scientific centre), pace making technology (small technology for betterment) and future technology (future researches of technology). Technology affects the outcomes of the firm and helps the firm to achieve their target customers by upgrading their technology. Also technology eliminates the wastage of time and efforts of the people which could be used in some other way. Technology involves use of resources efficiently by making the sustainable use of resources, employing, increasing competitiveness of resources etc. (Souchkov, 2012)(Orlikowski, 2000).

Recognising the target audience and starting the business as per their demand will focus on development of future and factors that affects the accepting and rejection of the technology. Acceptance could be meant as the act of adopting something or someone with consent. The demanded technology by the target audience needs to be upgraded that affects the working and outcomes of the organisation (Lucas, 2008)(Cavanaugh, 2001). The theory

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of technology adoption is needed to understand the way towards successful growth and understanding the needs of the consumers. The intention and the behaviour affects the purchase intention of the customers and their needs as well (Straub, 2009).

The theory of technology adoption models plays a greater role understand the buying intention of the consumers. There are certain models and theories that affects the theory of technology adoption that is – Roger's innovation diffusion theory (DOI), the concerns based adoption model, technology adoption model, unified theory of acceptance and use of technology (UTAUT) and UTAUT2, theory of planned behaviour (TPB), theory of reasoned action (TRA), Model of PC utilization, motivational model, social cognitive theory (SCT) etc. (Lai, 2017)(Oliveira & Martins, 2011).

These models focus on understanding the consumer's intention and behaviour towards purchasing, or selling or acquiring any sort of services which leads to the successful outcome of the firm. The firms focuses on these models to understand how, what, why consumer purchases a particular type of product and affects their choice towards buying them(Featherman & Pavlou, 2003)(Zhou, Lu, & Wang, 2010).

A firm must take into account the need for understanding more than one or two theories/ models because these theories gives the firm an overview about their target. It is most difficult for any firm to understand its target audience and these theories have several models that defines how the consumer makes a choice and what are the factors that influences these factors (Fichman, 2004)(Damanpour & Gopalakrishnan, 1998).

#### **II. LITERATURE REVIEW**

There are many theories and models of technology adoption to understand the need for understanding the needs to understand the consumer's behavioural intention towards buying products.



Figure 1: Diffusion of innovation theor

The theory lies with the innovation of the technology and how it affects the choice of the individual and leads to the innovation of the products in the minds and interest of the people. The theories deals with the elements related to the adoption of innovation. The theories addresses to the implementation, diffusion, dissemination and sustainability etc.(Rogers, 2003)(Cohen & Levinthal, 1990). It has 5 adopters that affected the choice of the people to adoption of new technology that are innovators (the people who are new to the innovation and has a will to take risks and develop the ideas), early adopters (the leaders which embrace the leadership roles and seeking new ideas),

early majority (these people adopt the technology before the average people adopted and innovation effectiveness) , late majority (they only adopt the technology when it has already been adopted and includes the innovation when it successfully implemented) and laggards (the fear appeal, pressure from the people's side)(Mintrom, 1997)(Sahin & Rogers, 2006).

The people adopts the innovation including the awareness and need for the innovation, decision to adopt or reject the innovation, initial use to test it and the other factors like the main 5 factors that is relative advantage the degree of innovation to better programs and ideas), compatibility (the consistency of innovation to adopt is made), complexity (the difficulty level in using the innovation), triability and observability(Cain & Mittman, 2002)(Sahin & Rogers, 2006).



Figure 2: Technology acceptance model

This theory is the extension of Ajzen and Fishbein's theory given by Fred Davis and Richard Bagozzi. A number of factors influence the decision of how and when they will the users uses the technology and there are no. of factors that influences the behaviour of the users while using it. There are certain determinants that affects the working of the technology acceptance model that is external variable (the variables that affects the external and internal working of the organisation), perceived usefulness (degree to which the system would be enhanced with his or her performance), perceived ease of use (the degree to which it is assumed that the system would be used irrespective from the efforts), attitude towards using (the attitude towards using the technology defines the success or declining rate of using the technology), behavioural intention to use (defines the intention of the individual towards using the technology which affects the behaviour) and actual system use (the method or the way through which one can use the technology in the system)(Venkatesh, Morris, Davis, & Davis, 2003)(Venkatesh, Thong, & Xu, 2012).



Figure 3: The concern-based adoption model

There are several facets of concern-based adoption model and the stages of concern are one of them. These stages are used for planning, mentoring and other developmental programs and activities. There are 7 stages of concern during which people's focus and concern shifts. The lower 3 stages "awareness, informational and personal" are focusing on individual itself. The use of 'me' and 'I' symbolises that the person is frustrated or self-centred(Kim, Chan, & Gupta, 2007). Whereas, the middle stage "management and consequences" focuses on expertizing the task and stepping ahead without only focusing on one self. They bothfocusesfrom the upper stages "collaboration and refocusing" on the clients or participants that focuses on the results and impact of the activity. Also these upper stages focuses on the concept of 'us' as team work(Zhou, 2011).

It discusses that innovation configuration map, levels of use and the stages of concern together leads to togetherness in this stage. The theory describes the individual behavioural changes with respect to the innovation in technology. The three factors that determine these three factors are:-

• Innovation configuration- it contributes to the struggle of staff efforts and provides a comprehensive image of the high quality implementation of the innovation

• Stages of concern- using way of interview, questionnaire and statement that depicts the attitude and belief towards the initiative. Leaders also take actions towards specific concerns.

• Level of use- depicts how well the employees itself and collectively using the program. Levels indicates the using of the program from least to most(Hsu, Ray, & Li-Hsieh, 2014).



Figure 4: Unified theory of acceptance and use of technology

This theory of unified theory of acceptance and use of technology is formulated by (Venkatesh et al., 2003) with the aim to explain the intention of the users towards using an information system and behaviour. There are four contributors of UTAUT model namely- performance expectancy, effort expectancy, social influence and facilitating conditions. The first three are direct determinants of the intention of the users as well as the behaviour. The four impacts the use of the behaviour and intention of the user i.e. gender, age, experience and voluntariness of use(Venkatesh, Viswanath, James Y. L. Thong, 2012).

Performance expectancy is the expected performance from the users after the use of innovation and technology. The effort expectancy is the efforts, contribution and willingness expected from each employee. Social influence is the effect of the individual towards the society and the societal effect on the working, thinking and behaviour of the individual. Then there is the need of the facilitating conditions that affect the individual and description in the behaviour. The gender, age, experience, voluntariness of use decides the factors that influence the behaviour of the individual. These factors determines how gender will affect the choice of technology in the organisation(Williams, Rana, & Dwivedi, 2015)(Troy Thomas, University of Guyana et al., 2013).

Behavioural intention determines that what affects the behaviour of the individual and behaviour and intention both contributes together towards the intention of the user towards using it(Alawadhi & Morris, 2008)(Oshlyansky, Cairns, & Thimbleby, 2007).



Figure 5: Unified theory of acceptance and use of technology

The issues related to the UTAUT model discusses about the factors affecting the behaviour and intention of the individual but there are certain factors that are left in the UTAUT model and the UTAUT2 model was made which discusses about the new ways driven out from the use of innovation and technology. The performance expectancy, efforts expectancy, social influence and facilitating conditions are the same as of the UTAUT model(Oechslein, Fleischmann, & Hess, 2014).

Hedonic motivation could be defined as the "the influence of the person's pleasure and pain receptors on their will to move towards the goal or away from the goals". It is based on some factors as well i.e. age, gender and experience as well. Price value of the technology driven product determines the price value of the product and the intention or the behaviour related to the product or technology. The price value of the product determines the intention of the individual in purchasing the product (Arenas-Gaitán, Peral-Peral, & Ramón-Jerónimo, 2015).

Habit is the greatest determinant of the individual behaviour. The habit of purchasing a single product is tends the individual to purchase the same product again and again. The tastes and preference makes the individual's habit(Slade, Williams, & Dwivedi, 2013)(Slade et al., 2013).

## III. METHODOLOGY

This paper aims at providing information about the theories and models related to the technology adoption. There are certain theories and models that contributes towards the purchase of the individual through affecting their behaviour, intention and motivation etc. these factors affects the intention of the individual towards purchasing and each theory contributes in one or the other way towards understanding the factors and the reasons that influences the buying behaviour of the individual. This paper deals with the secondary data and does not include any of the statistical data but only methods in a diagrammatic way. Each theory and method is designed and developed by different authors and each method/ theory has a different viewpoint and factor that contributes towards the understanding of the individual behaviour. An individual behaviour and psychology is complex and hard to be determined and when the theory is developed the studies and the data determines that what effects or influences the individual's choice. Any researcher can add on the statistical data to the paper.

#### IV. RESULT

This paper aimed at understanding the factors which influences the choice of the individual as well as the theories that affects the choices of the individual towards purchasing the product. The study determines that attitude, habit, gender age are the basic factors that determine the choice of the individual and is different in each and every case. The theories are studies and explained in different ways. The various theories have been considered and been statistically proved in different IT enabled services such as TAM has been used for healthcare(DeJong, 2013; Holden & Karsh, 2009; Lee et al., 2003; Pearl, 1997; R.J. & B.-T., 2010; Safdari, Saeedi, Valinejadi, Bouraghi, & Shahnavazi, 2017), Banking adding additional construct namely trust(Chen, 2012; Gu, Lee, & Suh, 2009; Gua, Leeb, & Suhc, 2009; Hong, 2019; Jackson, Chow, & Leitch, 2007; Rashed & Santos, 2014; Selvan, Arasu, & Sivagnanasundaram, 2011) and many other IT-enabled services (Bagozzi, 2018; Dishaw & Strong, 1999; Ha & Stoel, 2009; Hu, Chau, Liu Sheng, & Tam, 1999; Ma & Liu, 2011; Masrom, 2007; Priyanka, 2012; Wixom & Todd, 2005). Once (Viswanath & Hillol, 2008) developed the UTAUT model by adding all the models of adoption of technology the theory has been widely used to predict the acceptance of Technology in various areas like e-commerce E-learning, banking, tourism websites as well as apps(Al-Gahtani, Hubona, & Wang, 2007; Alawadhi & Morris, 2008; Curtis et al., 2010; Liu, Kostiwa, Marchewka, Liu, & Kostiwa, 2007; Min, Ji, & Qu, 2008; Oshlyansky et al., 2007; Troy Thomas, University of Guyana et al., 2013; Venkatesh, Viswanath, James Y. L. Thong, 2012; Venkatesh & Zhang, 2010; Williams et al., 2015; Zhou et al., 2010)

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